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09/908,732	07/20/2001	Jin-Soo Lee	LGE-012	8698
34610	7590	04/21/2006	EXAMINER	
FLESHNER & KIM, LLP P.O. BOX 221200 CHANTILLY, VA 20153			HUNG, YUBIN	
			ART UNIT	PAPER NUMBER
			2624	
DATE MAILED: 04/21/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/908,732

Applicant(s)

LEE ET AL.

Examiner

Yubin Hung

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,8-12 and 18-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,8-12 and 18-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 6/29/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***Response to Amendment/Arguments***

1. This action is in response to the amendment filed March 9, 2006.
2. Claims 1, 2, 8-12 and 18-31 are still pending.
3. Regarding the objection to the specification (Paragraph 6), the objection to Item 2 has been withdrawn as a result of Applicant's amendment. The objections to Items 1 and 3 are maintained.
4. Regarding the *35 USC § 112 rejections*, Applicant's argument with respect to claim 12 has been considered but is not persuasive (see below). Applicant has not responded to the rejection of claim 22. Therefore, the rejections to both claims are maintained.
5. Applicant's arguments filed 03/09/06 have been fully considered but they are not persuasive; see below.
6. **In remarks Applicant argued in substance:**

6.1 *that regarding lines 3-6 of claim 21, the claim is correct as written because of Figure 4 and page 8, paragraph 23. (P. 7, 2<sup>nd</sup> paragraph, P. 8, 3<sup>rd</sup> paragraph and P. 12, last paragraph-P. 13, line 4)*

However, in light of the specification the “bins” in the claim can only be interpreted as “bits”: Figure 1 and P. 6, paragraph 19 show histograms with bin values quantized to 1 bit (Fig. 1, ref. 101) and 2 bits (Fig. 1, ref. 102) and sharing a common threshold (TH1). Further, it is clear that Figure 4 and page 8, paragraph 23 disclose quantizing a bin value of a histogram into different number of bits. For example, when only one threshold (TH1) is used, a bin value is quantized into one bit (Fig. 4, ref. 401); on the other hand, when three thresholds (TH1-TH3) are used, a bin value is quantized into two bits (Fig. 4, ref. 402); and so on and so forth. Therefore, Figure 4 and page 8, paragraph 23 do not disclose quantizing color information of an image using N ( $N < M$ ) number of bins where the N bins and the M bins share at least one common threshold. Additionally, the description in page 10, paragraphs 27 and 28, especially, lines 5-7 of paragraph 28, makes this point even more clear.

Moreover, claim 21 is directed to the description of color information of images using a color histogram; nowhere is the comparison of two histograms with different number of bins (as asserted in P. 8, 3<sup>rd</sup> paragraph, lines 3-5 of Applicant's response) mentioned in the claim.

- 6.2 *(RE objection to claims 22 and 31 for failure to further limit) that claim 22 defines a method of searching “images described using the method of describing ... claim 21” (P. 8, lines 1-3)*

However, claim 22 is directed to *image searching* while claim 21 is directed to a method of *describing color information of images*. Since claim 22 does not add any additional limitations that will make the “method of describing ...” of claim 21 more specific, it fails to further limit. The same is also true for claim 31.

- 6.3 *(RE claim 23) that nowhere does Li teach transferring together and sequentially a bit from each of a plurality of bits (comprising the first bits, then the second bits, etc., of all bins) of a color histogram (P. 9, last paragraph)*

However, per the analysis and rejection of claim 23, Li discloses progressive transmission [Col. 4, lines 12- 25, especially line 15] of color histograms [Col. 1, lines 41-47, especially line 46]. Further, it is well known in the art that progressive transmission starts with all the most significant (i.e., first) bits from all data (e.g., bin values) to be transmitted, then all the second significant bits, then all the third significant bits, etc. Therefore, those (first, or second, or third, etc.) bits are transmitted together and sequentially. See, for example, column 1, lines 42-44 of Vishwanath (US 6,345,126) applied in the analysis and rejection of claim 23 in the Office Action mailed 05/02/05.

- 6.4 *(RE claim 1) that (1) Abdel-Mottaleb does not disclose or suggest a method where each bit is associated with a bin and a threshold (P. 11, 2<sup>nd</sup> paragraph, lines 2-4) and that (2) Li does not teach progressive transmission (P. 11, 2<sup>nd</sup> paragraph, last two lines)*

However, regarding (1), each received bit is from a bin of a histogram and is therefore inherently associated with a bin and a threshold, as per the analysis and rejection of claim 1 of the Office Action mailed 11/16/05. Regarding (2), Li has disclosed the use of progressive transmission, as discussed in 6.3 above.

- 6.5 *(RE claim 21) that Wittenstein and Topiwala in combination does not disclose or suggest that the histogram has N bins that are a subset of M bins, where both sets of bins share a common threshold (P. 13, 1st paragraph, lines 9-11)*

However, per Paragraph 6.1 above, this argument is not persuasive since the original disclosure only supports the interpretation of "bin" as "bit."

Moreover, even as recited (i.e., "bin" not interpreted as "bit"), Wittenstein still discloses all limitations of claim 21. [See the rejection of claim 21. Note that the histogram of Fig. 4, ref. 411 is the compressed result of spare color histogram (with, say, N bins) of ref. 410, which, in turn, is the decimated result of color histogram of ref. 408 (with, say, M bins). Since Topiwala teaches compressing a histogram by truncating least significant bits, per the analysis in the previous

Art Unit: 2624

rejection of claim 21, at least one common threshold is shared. Note also that the quantization of the histogram of Fig. 4, ref. 408 to that of ref. 410 also satisfies all limitations of claim 21 as recited since no change to the number of bits used for the bin values has been made in the process.]

***(From Office Action mailed 11/16/05)***

**Specification**

7. The disclosure is objected to because of the following informalities:
- Claim 21, lines 3-6: per page 10, paragraph 27, “bins” should have been “bits”  
**[For examination purpose, “bin” will be interpreted as “bit”]**
  - Claims 22 and 31 are objected to under 37 CFR 1.75I, as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Specifically, claim 22 is directed to image searching while claim 21 is directed to a method of describing color information of images. Since claim 22 does not add any additional limitations that will make the “method of describing ...” of claim 21 more specific, it fails to further limit. The same is also true for claim 31. **[Note: for examination purpose, claims 22 and 31 will be interpreted as independent claims.]**

Appropriate correction is required.



***Claim Rejections – 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, it is not clear which entity the characteristic of “M bins” (interpreted as M bits, per the reason given to the objection of claim 21 above) in line 3 is attributed to since M could be the maximal number of bits for the image's pixel values; or for the bin values of the histogram, i.e., the color information of the image, *before* quantization. Consequently the claim is rendered vague and indefinite. **[Note: for examination purpose, M will be interpreted as the maximal number of bits for each and every bin values of the histogram before quantization.]**

10. Claims 22 and are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. Specifically, no steps for image searching are recited in the claims.

***Claim Rejections – 35 USC § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 23 and 25-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al. (US 5,734,893).

13. Regarding claim 23, Li discloses

- transferring together and sequentially a first bit of each of a plurality of bins;  
transferring together and sequentially a second bit of each of the plurality of bins; and  
transferring together and sequentially all the bits having the same association for each of the plurality of bins until all bits have been transferred

[Fig. 1, refs. 101, 102; Col. 1, lines 42-47 and Col. 5, lines 20-26 (color histogram as query feature); Col. 3, lines 57- 66; Col. 4, lines 7-25 (progressive transmission over a network); Col. 8, lines 23-28 (transmitting most significant bits first). Note that progressive transmission starts with the most significant bit of all bin values of the color histogram]

14. Regarding claim 25, and similarly claims 26 and 27, the first bits of the bin values (the most significant bit is the first bit, per the analysis of claim 23 above) are inherently associated with the same threshold of  $2^{k-1}$ , where k is the number of bits used to represent each data (e.g., 8 bits for grey levels from 0 to 255).

Art Unit: 2624

15. Regarding claim 28, 29 and 30, the first bit (of a k-bit data value) [the most significant bit, per the analysis of claim 23 above] inherently indicates division based on the first threshold of  $2^{k-1}$ ; the second bit indicates division (by  $2^{k-2}$ ) of the section of the value divided by the first bit (i.e., the remaining k-1 bits), and so on and so forth.

### ***Claim Rejections – 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 1, 11 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abdel-Mottaleb et al. (US 6,163,622), in view of Li et al. (US 5,734,893).

18. Regarding claim 1, and similarly claim 11, Abdel-Mottaleb discloses

- receiving a first sequence of bits and a second sequence of bits  
[Fig. 1, refs. 110-116, 120; Col. 4, lines 9-25. Note that in a computer system data are represented as bits]
- each bit of the first sequence and each bit of the second sequence is associated with a bin and a threshold  
[Fig. 1, refs. 112, 116. Note that each bit of a value of either histogram (112 or 116) that is received is inherently associated with a bin and a threshold. (Assuming that each value is represented by k bits, with bit k-1 being the most significant, then bit l is associated with the threshold of  $2^l$ .)]

Abdel-Mottaleb does not expressly disclose

Art Unit: 2624

- wherein in the order of bits of both the first sequence and the second sequence, no adjacent bits have the same bin

However, per the analysis of claim 23, Li discloses a server [Fig. 1, ref. 103] receiving progressively transmitted bits of a color histogram. Being progressive, the histogram is received bit plane by bit plane, starting with the most significant bit plane. Therefore, no adjacent bits have the same bin.

Abdel-Mottaleb and Li are combinable because they both have aspects that are from the same field of endeavor of data retrieval.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Abdel-Mottaleb with the teaching of Li by progressively transmitting data, most significant bits first. The motivation would have been to minimize the lapse time between initiating a query and obtaining the result [Li: Col. 4, lines 20-25].

19. Regarding claim 31, the combined invention of Abdel-Mottaleb and Li further discloses

- searching images transferred using the method of claim 23  
[Li: Fig. 1: Col. 3, lines 57-67. Also per the analysis of claim 23, since Li anticipates claim 23]

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Art Unit: 2624

20. Claims 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abdel-Mottaleb et al. (US 6,163,622) and Li et al. (US 5,734,893) as applied to claims 1, 11 and 31 above, and further in view of Macisaac (GB 2,281,136A).

Regarding claim 2, and similarly claim 12, the combined invention of Abdel-Mottaleb and Li discloses all limitations of its parent, claim 1.

The combined invention of Abdel-Mottaleb and Li does not expressly disclose

- comparing a bit of the first sequence with a bit of the second sequence if the bit of the first sequence and the bit of the second sequence are associated with the same bin and same threshold

However, Macisaac discloses bit-by-bit comparison of two incoming bit streams [Fig. 1, refs. 12-16; P. 1, line 37-P. 2, line 4]. In addition, **Official Notice** is taken that since the combined invention of Abdel-Mottaleb and Li is directed to image retrieval by determining the similarity of feature data (histograms in this case) [Abdel-Mottaleb: Fig. 1, refs. 112, 116, 120, 122], it would have been obvious to one of ordinary skill in the art at the time of the invention to compare bits only if they are associated with the same bin and the same threshold (i.e., bit I of the value of bin k from the histogram 112 with bit I of the value of bin k from histogram 116) because otherwise the comparison will not be meaningful.

The combined invention of Abdel-Mottaleb and Li is combinable with Macisaac because they both have aspects that are from the same field of endeavor of data transmission.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Abdel-Mottaleb and Li with the teaching of Macisaac by comparing a bit of the first sequence with a bit of the second sequence if the bit of the first sequence and the bit of the second sequence are associated with the same bin and same threshold. The motivation would have been to decrease the latency time (since comparison can start when the first bit pair is received) and also to make the comparison meaningful (since, obviously, if the most significant bit from the first histogram is compared with the next significant bit of the second histogram, then even if their corresponding bins have the same value, the comparison result may not reflect that).

Therefore, it would have been obvious to combine Macisaac with Abdel-Mottaleb and Li to obtain the invention as specified in claim 2.

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21. Claims 8-10 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abdel-Mottaleb et al. (US 6,163,622) and Li et al. (US 5,734,893), as applied to claims 1, 11 and 31 above, and further in view of Cheung et al. ("Progressive Image Transmission by Linear Quadtree Coding and Wavelet Transformation," *13<sup>th</sup> Int'l Conf. On Digital Signal Processing*, V. 2, 1997, pp. 475-478).

Art Unit: 2624

22. Regarding claim 8, and similarly claim 18, the combined invention of Abdel-Mottaleb and Li discloses everything.

The combined invention of Abdel-Mottaleb and Li does not expressly disclose

- in the order of bits of both the first sequence and the second sequence, bits associated with the same threshold are grouped together in groups

However, Cheung teaches/suggests grouping bits (in the order or their respective sequences) associated with the same threshold together. [See Fig. 2.2; P. 475, Sections 2.2-2.3; P. 476, Sect. 3.3, 3<sup>rd</sup> paragraph, lines 5-7. Note that the coefficients correspond to the magnitudes and the levels the nodes reside correspond to the values. Clearly sorting in this manner will group values of the same associated magnitude together]

The combined invention of Abdel-Mottaleb and Li is combinable with Cheung because they are from the same field of endeavor of image compression.

23. At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Abdel-Mottaleb and Li with the teaching of Cheung by grouping values with the same associated coefficient (i.e., magnitude). The motivation would have been to order information by importance, as stated in Cheung [P. 476, Sect. 3.3, 3<sup>rd</sup> paragraph, lines 5-7].

Art Unit: 2624

24. Therefore, it would have been obvious to combine Cheung with Abdel-Mottaleb and Li to obtain the invention specified in claim 8.

25. Regarding claim 9, and similarly claim 19, Cheung further teaches

- the order of the groups is according to resolution of information of each bit of each group [Per the analysis of claim 8; P. 476, Sect. 3.3, 3<sup>rd</sup> paragraph, lines 5-7. Note that the value of a coefficient reflects its information content, i.e., the "resolution" of information]

26. Regarding claim 10, and similarly claim 20, Cheung further teaches

- in the order of bits of both the first sequence of bits and the second sequence of bits, each bit is associated with a resolution equal to or higher than the preceding bit's [Fig. 2.2; P. 475, Sections 2.2-2.3; P. 476, Sect. 3.3, 3<sup>rd</sup> paragraph, lines 5-7. Note that the value of a coefficient reflects its information content, i.e., the "resolution" of information. Note further that the well-known technique of sorting data (coefficient in this case) into an increasing order will result in each value being associated with a resolution equal to or higher than the preceding value's]

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27. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Wittenstein et al. (US 6,026,180), in view of Topiwala et al. (US 6,771,829).

28. Regarding claim 21 (as interpreted), Wittenstein discloses

- describing the image using the *compressed* color information (where  $N < M$ ), and wherein N number of bits and M number of bits share at least one common threshold [Abstract, lines 10-12; Fig. 4, ref. 411; Col. 7, lines 5-21. Note that a color histogram of an image is a statistical description of that image's color information. Note that since the compression (quantization) is obtained by dropping least significant bits (per Topiwala; see below), the, say, most significant, bit of a quantized value still has the same significance as the MSB of the original value which, in this case, is associated with a threshold of  $2^{M-1}$ . Since at least the MSB remains after truncation, at least one common threshold,  $2^{M-1}$ , is shared]

29. Wittenstein does not expressly disclose that the compressed color histogram (i.e., color information) is obtained by quantization in the following manner



Art Unit: 2624

- selecting a number N of bits as a subset of M bits; and quantizing color information using the N number of bits [Fig. 1A; Col. 3, lines 30-33.]

However, Topiwala discloses compression by quantization. [Fig. 1A; Col. 3, lines 30-33. Note that truncating least significant bits is a form of quantization.]

Wittenstein is combinable with Topiwala because they have aspects that are from the same field of endeavor of data compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Wittenstein with the teaching of Topiwala by using truncation (a form of quantization) to obtain the compress histogram. The motivation would have been because truncation is easy to implement and involves very little computation cost and also because the most significant information is preserved.

Therefore, it would have been obvious to combine Topiwala with Wittenstein to obtain the invention as specified in claim 21.

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30. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abdel-Mottaleb et al. (US 6,163,622), in view of Wittenstein et al. (US 6,026,180) and Topiwala et al. (US 6,771,829).

Art Unit: 2624

Regarding claim 22, Abdel-Mottaleb discloses an image searching method using histograms [Fig. 1]. In addition, the combined invention of Wittenstein and Topiwala discloses an image description (i.e., compressed color histogram) as recited in claim 21.

Abdel-Mattaleb is combinable with the combined invention of Topiwala and Wittenstein because they have aspects that are from the same field of endeavor of histogram processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Abdel-Mattaleb with the teaching of the combined invention of Topiwala and Wittenstein by performing search on the described images. The motivation would have been to lower the search cost since the query (i.e., compressed histogram or quantized color information) is smaller in size as would have been obvious to one of ordinary skill in the art.

Therefore, it would have been obvious to combine Topiwala and Wittenstein with Abdel-Mottaleb to obtain the invention as specified in claim 22.

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31. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 5,734,893), as applied to claims 23 and 25-30 above, and further in view of Fukushima (US 5,724,457).

Art Unit: 2624

Regarding claim 24, Li discloses all limitations of its parent, claim 23.

Li does not expressly disclose

- in the event that the transfer is interrupted before completion, a query can be executed on the transferred portion

However, Fukushima teaches/suggests matching using only partial matching using the prefix (i.e., front portion) of an input (i.e., query) string. [Fig. 1, ref. 60; Col. 6, lines 10-22. Note the bits transferred prior to the interruption constitute the prefix of the entire set of bits that were to be transferred.]

Li is combinable with Fukushima because they have aspects that are from the same field of endeavor of image transmission.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Li with the teaching of Fukushima by performing query using the data received prior to transmission interruption. The motivation would have been because matching based on prefixes frequently still can provide a manageable set of candidates that can include the intended query results.

Therefore, it would have been obvious to combine Fukushima with Li to obtain the invention specified in claim 24.

**Contact Information**

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung  
Patent Examiner  
April 12, 2006

  
JINGGE WU  
PRIMARY EXAMINER